FOREWORD

SPECIAL ISSUE
BIOTECHNOLOGY: THE AFRICAN PERSPECTIVE

Biotechnology became a catchword nearly three decades ago, capitalising greatly from the first results of work on recombinant DNA and the roles foreseen for gene technology, gene transfer and gene manipulation. From humble beginnings rooted in early crop domestication and home-based food processing (used, for example, to make bread, cheese and alcoholic beverages), modern biotechnology bears testimony to the scientific ground covered in a remarkably short time frame. Originally, plant biotechnology was seen as the utilisation of *in vitro*-based tissue culture systems for the enhancement of yield and quality through clonal micropropagation, production of secondary products, and as an aid to modern plant breeding. With the advent of molecular biology in the late 1970s, another dimension was added, namely, the use of theoretical and applied genetics as a basis for the isolation and manipulation of hereditary material. For a comprehensive — even if now somewhat dated — overview of plant biotechnology, see Hess (1992).

Research development in modern biotechnology occurred largely in the industrialised world and overwhelmingly so in the USA. Although transformation of most major annual crop plants has been achieved, to date relatively few commercial transgenic crop species have been developed (Murphy 2003). The focus has almost exclusively been on engineering for so-called *input* traits: those features that affect cultivation and yield, but not necessarily quality. Murphy (2003) stressed, however, that biotechnology is much more than the production of genetically-manipulated organisms. Molecular marker techniques such as DNA fingerprinting and genomic profiling are new approaches that may help to accelerate the identification of new genotypes in conventional crop, ornamental, horticultural and medicinal plant selection and breeding programmes, whose applications may be extended to their conservation. In addition to tissue culture-based technologies, these non-transgenic approaches are expected to lie within easier reach of developing countries.

Sub-Saharan Africa, with its 47 developing countries and approximately 650 million people, comprises the six regions of west, central, east and southern Africa, the Horn of Africa and the Indian Ocean Islands. This vast sub-continent encompasses different climatic zones that include desert and semi-desert landscapes, tropical rainforests, dry grassland and the great southern plateau. Africa hosts the most biodiverse and unique flora of the world's continents, yet its farmers are poor, subsistence agriculture predominates, and half of its people live on USD0.65 or less a day (The Economist 2004). Kelemu *et al.* (2003) aptly described Africa as the 'land of poverty among plenty'. In the areas viable for cultivation, a great diversity of crops are grown, including tea, coffee, cotton, maize, sorghum, millets, groundnuts, cassava, potatoes, pulses, vines, citrus fruits, sugarcane, sisal, rubber, tree crops and a variety of indigenous leafy and root vegetables.

We believe a strong case can be made for the application of *sustainable* biotechnology to help alleviate the major problems of food insecurity and malnutrition. Admittedly, as Chrispeels and Mandoli (2003) pointed out, sustainability 'is a slippery entity' definable at many different levels, including ethical, global, political, sociological and technological ones. These authors raise the important issue of intellectual property rights and pose two questions that have an important bearing on biotechnology in developing countries. The first is whether the preoccupation of many universities and research institutions with patent protection and licensing has not become an impediment to the free flow of ideas and materials? The second, when industry or university researchers use germplasm from developing countries to isolate important genes (e.g. *output* genes), are they free to patent these genes without rewarding the indigeneous peoples who have the prior and traditional knowledge of their beneficial effects?

In the African context, for biotechnology to be made sustainable two factors will be of utmost importance: the recognition that **only** those technologies that can be translated into practice are of any use, and a demonstration by political leaders of the **will** to break their countries out of their perpetual dependence on food aid.

This special issue on biotechnology in the perspective of Africa, more particularly that of sub-Saharan Africa, consists of 24 papers by 49 authors from five universities and eight research institutes. It represents a collective experience that covers a wide variety of plants and technical expertise. Above all, it demonstrates the potential that Africa has for contributing to the solution of some of Africa's problems.

References

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NOTE:

As Editorial Board we owe Chris Bornman a great debt for the thought and time he spent on editing and putting this special issue together. Born in Africa he will always have the well-being of this remarkable continent, so frequently written off, at heart. Our sincere thanks.

PROFESSOR J VAN STADEN FRRSAf
Editor-in-Chief

SAPSE ACCREDITATION

According to the Government Gazette, Regulation Gazette No. 7794 (Vol. 460, 14 October 2003, No. 25583, http://www.gov.za/gazette/regulation/2003/25583.pdf, pg 7) recognised research output meeting specified criteria are eligible for subsidisation. For purposes of subsidy, only qualifying journals in the following categories are recognised:

Section (1): Journals appearing in the following international indices (ISI) are included in the list of approved journals;
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(c) The Arts and Humanities Citation Index of the ISI
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